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FACTORS AFFECTING FARMER'S READINESS FOR ENTITLING THE STANDARD SWINE FARM

ปัจจัยที่มีผลต่อความพร้อมของเกษตรกรเพื่อการเป็นฟาร์มสุกรมาตรฐาน

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Abstract

The objectives of the study were to obtain: 1) farm management of the farmers under the swine farm standard and 2) factors affecting farmer's readiness for entitling the standard swine farm. The samples were drawn from 78 swine farmers in Sam Khwai Phueak sub-district, Mueang district, Nakhon Pathom province. The analytical tools of the study comprised descriptive statistics and a multinomial logit model for analyzing the factors affecting farmer's readiness for entitling the standard swine farm. The finding indicated that according to the swine farm standard, the majority of the farmers have performed as follows: 1) farm composition aspect: the barn is strongly constructed; 2) farm management aspect: the farm production is separated from resident area and feed is freshly mixed and prepared according to different swine races and ages; 3) animal health aspect: foot and mouth disease (FMD) and swine fever (SF) vaccination program must be provided at least twice a year and the separation of infected swine is required; and 4) environmental management aspect: waste accumulating pond must be installed on farm and wastewater inspection must be performed regularly. However, making a manual to keep the farm record for farm management was considered as the key obstacle to fulfill the farm standard. The key factors affecting the farmers' readiness to perform in accordance with the farm standard were frequency of the information access on farm

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standard, farmers' attitude towards the expected benefits derived from being a standard farm, and the farm size, respectively. In order to promote farmers preparing themselves to entitle the standard farm, the relevant agencies had to continuously and vastly disseminate information about swine farm standard and its expected benefits to the farmers. In addition, the farmers had to be encouraged and instructed to keep their farm record so as to serve the farm management aspect required by the farm standard.

Keywords: readiness, swine, farm standard

บทคัดย่อ

วัตถุประสงค์ของการวิจัยเพื่อศึกษา 1) สถานภาพการจัดการฟาร์มภายใต้ข้อกำหนดมาตรฐานฟาร์มสุกร และ 2) ปัจจัยที่มีอิทธิพลต่อความพร้อมของเกษตรกรเพื่อการเป็นฟาร์มสุกรมาตรฐาน กลุ่มตัวอย่างที่ใช้ในการศึกษา คือ เกษตรกรผู้เลี้ยงสุกรในตำบลสามควายเผือก อำเภอเมือง จังหวัดนครปฐม จำนวน 78 ฟาร์ม เครื่องมือที่ใช้ในการวิเคราะห์ข้อมูล ได้แก่ สถิติเชิงพรรณนา และแบบจำลองมัลติโนเมียล โลจิท ในการวิเคราะห์ปัจจัยที่มีอิทธิพลต่อความพร้อมของเกษตรกรเพื่อการเป็นฟาร์มสุกรมาตรฐาน ผลการวิจัย พบว่า ภายใต้ข้อกำหนดมาตรฐานฟาร์มสุกร เกษตรกรส่วนใหญ่มีการปฏิบัติดังนี้ 1) ด้านองค์ประกอบฟาร์ม คือ มีโครงสร้างโรงเรือนที่มั่นคงแข็งแรง 2) ด้านการจัดการฟาร์ม คือ มีส่วนการผลิตแยกออกจากพื้นที่พักอาศัย อาหารที่ให้ต้องเป็นอาหารผสมใหม่ และมีการเตรียมอาหารแยกตามชนิดและช่วงอายุสุกร 3) ด้านการจัดการสุขภาพสัตว์ คือ มีโปรแกรมวัคซีน FMD และ SF อย่างน้อยปีละ 2 ครั้ง และมีการแยกสุกรป่วยออกจากฝูง และ 4) ด้านการจัดการสิ่งแวดล้อม คือ มีบ่อกักเก็บน้ำเสียภายในฟาร์ม และมีการตรวจสอบคุณภาพน้ำเสียจากกิจกรรมการเลี้ยงสุกรก่อนที่จะระบายออกสู่ภายนอก อนึ่ง การมีคู่มือบันทึกข้อมูลเพื่อการจัดการฟาร์มถือเป็นข้อจำกัดสำคัญของเกษตรกรในการปฏิบัติตามข้อกำหนดมาตรฐานฟาร์ม สำหรับปัจจัยสำคัญที่มีอิทธิพลต่อความพร้อมของเกษตรกรเพื่อการเป็นฟาร์มสุกรมาตรฐาน คือ ความถี่ในการรับรู้ข่าวสารเกี่ยวกับมาตรฐานฟาร์ม ความคิดเห็นต่อผลประโยชน์ที่คาดว่าจะได้รับจากการเป็นฟาร์มมาตรฐาน และขนาดฟาร์มตามลำดับ ดังนั้นการส่งเสริมให้เกษตรกรเตรียมความพร้อมเพื่อการเป็นฟาร์มสุกรมาตรฐานนั้น หน่วยงานที่เกี่ยวข้อง ควรเน้นเกี่ยวกับการให้ข้อมูลข่าวสารด้านมาตรฐานฟาร์มสุกรและประชาสัมพันธ์ให้เกษตรกรเห็นถึงผลประโยชน์ที่คาดว่าจะได้รับจากการเป็นฟาร์มมาตรฐานอย่างต่อเนื่อง นอกจากนี้ ควรมีการแนะนำและส่งเสริมให้เกษตรกรมีการจดบันทึกฟาร์มเพื่อให้เป็นไปตามข้อกำหนดมาตรฐานฟาร์มสุกรด้านการจัดการฟาร์ม

คำสำคัญ: ความพร้อม, สุกร, มาตรฐานฟาร์ม

Introduction

Currently swine farm practice becomes more commercial and widely expanded closer to communities. This leads to environmental problems in terms of wastewater and air pollution due to mismanagement of swine waste. Furthermore, the limitations on farm size and production fund including farm malpractice in swine production can cause a number of swine farms to have significant obstacles to meet the requirements of the farm standard determined by the Thai Ministry of Agriculture and Cooperatives. The Office of Agricultural Economics[1] indicated that though the related agencies including domestic and international buyers have imposed on farm standard practice in swine production, the farmers still ignore this farm standard. According to the total

number of the entire 200,000 swine farms in Thailand, only 3,470 swine farms can formally entitle to be standard farms. The Thai Department of Livestock Development[2] showed that, in 2008, Nakhon Pathom province was ranked as the second place for producing swine in the country. Muang district alone could produce up to 464,429 swine or 66.09% of the provincial swine production. Sam Khwai Phueak sub-district, under the Muang district, is one of the major places for swine production in Nakhon Pathom province. The swine farm practices in this area are considered conservative and small associating with lacking of the farm standard and mismanagement including inefficiency in farm waste treatment.[3] In addition, according to the survey, 98.10% of the farmers in this area are not interested in entitling as standard farm. Thus, there is no surprise that this area has been facing major environmental problems especially the water pollution in term of wastewater and odor in Jedee Bucha canal, the only one canal in the area.

However, the government has been attempting to solve the environmental problems due to the swine production by means of encouraging these swine farms to register to be standard farms as many as possible. The swine farm standard composes 4 major categories: 1) farm components; 2) farm management; 3) animal health management; and 4) environmental management. According to the Thai Department of Livestock Development[4], the benefits derived from being the standard farm are an increase in farm profit, hygienic swine production in favor of consumers, and environmental improvement participation among the farmers. Farm environmental management is significantly considered to reduce soil, water, and air pollution problems which are important agricultural causes of global warming. Thus, to be entitled as a standard swine farm, farmers should prepare themselves to manage their farms properly. In order to do so, exploring on factors affecting farmer's readiness for entitling the standard farm is necessary and crucial for policy implications. The purposes of this research were to study:

1) Farm management of the farmers under the swine farm standard.

2) Factors affecting farmer's readiness for entitling the standard swine farm.

Materials and methods

This study is based on the field survey data drawn from the interviews of 78 out of the total 97 farmers in Sam Khwai

Phueak sub-district, Muang district, Nakhon Pathom province. A snow ball sampling process was applied in the survey. Fundamental statistics and multinomial logit model were used to analyze and calibrate all the obtained data. In this study, the level of readiness in farm management means the intension of swine farmer to operate his farm in accordance with the farm standard which comprises 4 categories: 1) farm composition; 2) farm management; 3) animal health management; and 4) farm environmental management. This farmer's readiness is divided into 3 levels: high, medium, and low. The high readiness (given by the points ranging between 2.34 and 3.00) is associated with the level that farmer intends to operate his farm under the farm standard "constantly". The medium level (given by the points ranging between 1.67 and 2.33) means that farmer "occasionally" operates his farm in accordance with the farm standard. Lastly, the low level (given by the points ranging between 1.00 and 1.66) means that farmer "hardly or never" operates his farm under the farm standard.

The multinomial logit model was applied to describe factors affecting the readiness of the swine farmer to be certified as the standard farm based on his socioeconomic and related decisional factors. The dependent variable is divided into 3 levels of readiness while the independent variables are the significant decisional factors of the farmer as shown in the following mathematical form:

$$\Pr_j(i) = \frac{e^{u_{ij}}}{e^{u_j \text{ low level of readiness}} + e^{u_{\text{j medium level of readiness}}} + e^{u_{\text{j high level of readiness}}}}$$

where $\Pr_j(i)$ is probability of having readiness level i of swine farmer j

U_{ij} is utility of having readiness level i of swine farmer j

i is readiness level to be the standard swine farm:
i = 1 low level of readiness
i = 2 medium level of readiness
i = 3 high level of readiness

j is the swine farmer, j = 1,…,78

e is natural logarithm value = 2.7183

Based on the multinomial logit model, the utility function is important to formulate factors affecting the readiness level of the swine farmer to reach the farm standard and it can be written as follows:

$$U_{ijk} = \beta_{0ijk} + \beta_1 X_{1ij} + \beta_2 X_{2\,ij} + \beta_3 X_{3i\,j} + \beta_4 X_{4i\,j} + \beta_5 X_{5ij} + \beta_6 X_{6ij} +$$

$$\beta_7 X_{7ij} + \beta_8 X_{8ij} + \beta_9 X_{9ij} + \beta_{10} X_{10ij} + \beta_{11} X_{11ij} + \beta_{12} X_{12ij} + \varepsilon_{ij}$$

where

X_1 = education level (year number)
X_2 = farm experience (year number)
X_3 = farmer's opinion on the farm standard
X_4 = farmer's opinion on expected benefits from the farm standard
X_5 = farm income from swine production (baht/year/household)
X_6 = non-farm income (baht/year household)
X_7 = cost of swine production (baht/year/household)
X_8 = farmer's debts (baht/year/household)
X_9 = farm size (rai)
X_{10} = number of farm labors (people number)
X_{11} = membership of organization
X_{12} = frequency of receiving information about the farm standard
k = coefficients of each readiness level, k =1, 2, 3

Results

The study's results are divided into 2 parts: 1) existing farm management under the swine farm standard, and 2) factors affecting readiness of the swine farmer to entitle the standard swine farm. The results are shown as follows:

1. Existing Farm Management under the Swine Farm Standard

In general, over 50% of the swine farmers in the area operate their farms in accordance with the farm standard. Under the farm standard categories in terms of the farm components, 98.7% of the farms have strong barn structure; 97.8% associate with appropriate barn size based on the number of swine raised; 76.9% have proper space for farm waste treatment system, respectively. As such, the farm with strong barn structure and appropriate size is safe and comfortable for workers to manage feed and water on the farm. It is also beneficial to swine in terms of having enough space to live (not too congested) and reducing stress of the animals. In addition, each farm should have adequate space for wastewater management in order to prevent water pollution runoffs to the environment. On the contrary, the swine farms (100%) do not meet the farm component requirements can be described

as the farms located within the radius of 3 km apart from either community or other swine farms. Moreover, 97.4% of the farms have the barn built close to the residential area within 25 m due to limited farm space. It is unsurprisingly that most swine farms in the study area are operated in an old fashioned way associated with less farm space than the modern farms.

Under the category of the farm management, most swine farms pass this standard shown in terms of: separated barn from feed mixing process; hygienic feed; and feed grading in accordance with swine types and ages. Accordingly, the farmers know that separation barn space (into different types of swine: breeding, baby, and fattened swine) from feed mixing process is necessary for managing appropriate feed to different swine types due to their different growth rates. In contrast, the farm without the farm manual, especially the manual of farm waste and environmental management, overrule this farm management standard. In addition, more than 95% of the farmers do not have any record on vehicles or persons entering/ exiting the farm and farm cleaning process since they have limited proper knowledge on recording these necessary farm data. Moreover, farmers often reveal that farm manual recording is complicated and it wastes their time.

For the animal health management standard, all the farmers, who are able to fulfill this standard, impose the FMD and SF vaccination programs at least twice a year on their farms and separate sick swine from healthy swine. Furthermore, 76.9% of the farmers handle their sick swine by consulting veterinarians in order to stop the cycle of foot and mouth disease outbreak in time and more efficiently. However, 96.2% of the swine farms have obstacles in installing necessary disinfection facilities on the farms due to limitations on farm space and sources of fund.

In order to meet the farm environmental management standard, waste collecting ponds, farm drainage system, farm wastewater inspection process must be available on the farm. There are 79.5% of the swine farms meeting this standard. It is fortunate that at least farmers are somehow aware of environmental problems drawn from farm wastewater. However, the efficiency of the wastewater treatment system is more important to indicate the quality of wastewater released outside the farm. The other requirements are such as barn cleaning (at least twice a day) and dead swine management by burning or burying. However, 97.4% and 74.4% of the farms fail to have appropriate practices in dead swine and trash management, respectively. This is due to the fact that a

number of farms can sell their dead swine to local buyers, hence farmers can also earn some additional money from disposing dead swine.

2. Factors Affecting Readiness of the Swine Farmer to Entitle the Standard Swine Farm

Table 1 presents factors affecting readiness of the swine farmers to entitle the standard swine farm in terms of the marginal effect values. Upon the constant values, the farmers in the study area have engaged in the medium level of readiness comparatively to the other 2 levels of readiness. However, the frequency of receiving information about the farm standard, farmer's opinion on expected benefits from being the farm standard, and the level of the farmer's education are the top three factors considered to affect the farmer's readiness yielding the marginal effect values of 0.541, 0.148, and 0.131 respectively. It means that if the farmer receives the information about the farm standard one time additionally, the probability of the high level of readiness will increase by 54.1%. The pattern of explaining the effects of farmer's opinion on expected benefits and education level is similar. Although farmers constantly receive information about the farm standard, their farm practices remain unchanged because the elasticity to change from regular practice to follow the farm standard is limited in terms of management costs and time.

However, on the other side, the frequency of receiving the information is considered as the most important factor (the marginal effect = 0.599) for the farmer who started to enter into the farm standard registration process. In other words, dissemination of the information about the farm standard is significantly important to the farmer who is beginning to register in the farm standard process. Briefly to summarize that dissemination of the information about the farm standard is the most important factor to both the beginning and the advanced farmers who wish to participate in the farm standard process.

Another important factor to encourage the farmers to have higher level of readiness is that the related agencies should focus on providing or portrait the picture of expected benefits derived from entitling the standard farm. It can be clearly seen from the results that if the farmer expects to obtain additional benefit from entitling the standard farm, the probability of the high level of readiness will increase by 14.8%. Likewise, education level of the farmers is also a significant factor indicating the high level of readiness (additional level of education leads to the increase in readiness probability of 13.1%).

However, most swine farmers in the study area are old generation, thus encouraging their young generation, who have higher education, to continue operating the farms handed from their parents is worth to consider as another policy implication.

Table 1 Marginal Effect Values of the Factors Affecting Farmer's Readiness to Entitle the Standard Swine Farm (with 5% significant level)

Factors	Level of Readiness		
	Low	Medium	High
Constant	0.018	2.010	-2.028
Education Level	-0.042	-0.089	0.131
Farmer's Opinion on Expected Benefits from the Farm Standard	-0.203	0.054	0.148
Farm Income from Swine Production	-0.082	0.054	0.028
Cost of Swine Production	0.027	-0.092	0.065
Farm Size	0.005	-0.066	0.060
Frequency of Receiving Information about the Farm Standard	0.599	-1.140	0.541

Conclusion and Recommendation

This study aims to analyze factors affecting farmer's readiness for entitling the standard swine farm. Under the 4 categories of the farm standard, it is found that: 1) farm composition aspect: the barn is strongly constructed, associate with appropriate barn size based on the number of swine raised and have proper space for farm waste treatment system; 2) farm management aspect: the farm production is separated from resident area and feed is freshly mixed and feed grad in accordance with swine types and ages; 3) animal health aspect: FMD and SF vaccination programs at least twice a year on their farms and separate sick swine from healthy swine and 4) environmental management aspect: waste collecting ponds, farm drainage system, farm wastewater inspection process must be available on the farm and the other requirements such as barn cleaning (at least twice a day).

In order to promote farmers preparing themselves to entitle the standard farm, the relevant agencies should continuously and vastly disseminate information about swine farm standard and its expected benefits to

the farmers. In addition, the farmers should be encouraged and instructed to keep their farm record so as to serve the farm management aspect required by the farm standard. Lastly, since the young generation tends to have higher education level, awareness of the young generation to continue their farm business handed from their parents generation should be promoted in terms of revealing explicit economic incentives and cultural value to run their family business.

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